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Ermanno Filippi

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AKERMAN SENTERFITT

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EXAMINER

YOUNG, NATASHA E

ART UNIT

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1797

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/519,742 | <b>Applicant(s)</b><br>FILIPPI ET AL. |  |
|                              | <b>Examiner</b><br>NATASHA YOUNG     | <b>Art Unit</b><br>1797               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennen et al (WO 00/43358) in view of Reppich (Use of high performance plate heat exchangers in chemical and process industries, 1999).

Regarding claim 1, Mennen et al discloses a plant for urea production from ammonia and carbon dioxide having a so-called high-pressure section which comprises a generally cylindrical synthesis reactor defining a longitudinal axis thereof and a condensation unit positioned inside said reactor (see figure 5), all substantially operating at the same pressure (see Abstract and page 6, line 11 through page 8, line 18).

Mennen et al does not disclose the condensation unit wherein said condensation unit comprises a plurality of flattened plate-shaped essentially rectangular heat exchangers, arranged with long sides parallel to the longitudinal axis of said reactor.

However, Mennen et al discloses the gas/liquid mixture passes through the condenser tubes which ensures intimate mixing of the carbamate in the condenser section and generates turbulence, which is favourable for heat transfer (see page 7, lines 4-21).

Reppich discloses plate heat exchangers for use in chemical and process industries a plurality of flattened plate-shaped essentially rectangular heat exchangers (see Abstract and figure 1-2)

Reppich does not disclose how the plates would be arranged in cylinder housing.

It would have been obvious to one having in the art at the time the invention was made to arrange the plates with long side parallel to the longitudinal axis of the housing,

since it is believe that is the direct of fluid flow such that the plates would be in intimate contact with the fluid as it travels through the housing for mixing and increased heat transfer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich such that the condensation unit comprises a plurality of flattened plate-shaped essentially rectangular heat exchangers, arranged with long sides parallel to the longitudinal axis of said reactor for high degree of turbulence, achieved even at low flow velocities, and at Reynolds number as low as 10 and higher overall heat transfer (see Reppich section 5, paragraphs 1-2) and for the benefits of low space requirement, faster start up/shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Claim 2 depends of claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claim.

Regarding claim 2, Mennen et al does not disclose a plant wherein each of said exchangers comprises a pair of juxtaposed metallic plates, joined together byperimetric weldings so as to define a chamber of predetermined width between them.

Reppich discloses a heat exchanger wherein each of said exchangers comprises a pair of juxtaposed metallic plates, joined together by perimetric welding so as to define a chamber of predetermined width between them (see pages 1001-1002, section 2.2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Claim 6 depends of claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 6, Mennen et al does not disclose a plant wherein each of said exchangers comprises at least one distributor duct and at least one collector duct of an operating heat exchange fluid, associated with two respective opposite sides of said exchanger and extending along them said ducts being in fluid communication on one side with said chamber through at least one opening formed in them and, on the other side, with the outside of said exchangers, through respective connectors for the entry and exit of said operating fluid, positioned on a same short side of the exchanger.

Reppich discloses each of said exchangers comprises at least one distributor duct and at least one collector duct of an operating heat exchange fluid, associated with two respective opposite sides of said exchanger and extending along them said ducts being in fluid communication on one side with said chamber through at least one opening formed in them and, on the other side, with the outside of said exchangers,

through respective connectors for the entry and exit of said operating fluid, positioned on a same short side of the exchanger (see figures 1-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Claim 7 depends of claim 6 such that the reasoning used to reject claim 6 will be used to reject the dependent portions of the claim.

Regarding claim 7, Mennen et al does not disclose a plant wherein said ducts consist of respective tubes, positioned in said chamber and fixed to said opposite long sides of the exchanger.

Reppich discloses plate heat exchanger in which heat exchange fluid travels (see figures 1-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and

easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect tubes to the inlets and outlets of the heat exchangers for receiving and discharging the feed and heat exchange fluid since it is known in the art that there media in which heat is transfer and a mode of transport of heat transfer media.

Claim 8 depends of claim 7 such that the reasoning used to reject claim 7 will be used to reject the dependent portions of the claim.

Regarding claim 8, Mennen et al does not disclose a plant wherein said ducts are directly formed in correspondence with said long sides at the time of the forming of the exchanger.

Reppich discloses said ducts are directly formed in correspondence with said long sides at the time of the forming of the exchanger (see figures 1-2).

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennen et al (WO 00/43358) and Reppich (Use of high performance heat exchangers in chemical and process industries, 1999) as applied to claim 2 above, and further in view of Rohsenow et al (Handbook of Heat Transfer, 1998).

Claim 3 depends of claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 3, Mennen et al does not disclose a plant wherein said plates are also joined together through a plurality of welding points defining in said chamber a



plurality of winding paths in fluid communication with each other and with connectors for the entry and exit, respectively, of a heat exchange fluid into and from the respective heat exchanger, said connectors being provided for on opposite sides of said exchangers.

Reppich discloses welded plate (see pages 1001-1002, section 2.2).

Reppich does not disclose said plates are also joined together through a plurality of welding points defining in said chamber a plurality of winding paths in fluid communication with each other and with connectors for the entry and exit, respectively, of a heat exchange fluid into and from the respective heat exchanger, said connectors being provided for on opposite sides of said exchangers.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Rohsenow et al discloses heat exchanger plate are wound in an exchanger (see page 17.22, 3rd paragraph), which would define a plurality of winding paths in fluid communication with each other and with connectors for the entry and exit, respectively, of a heat exchange fluid into and from the respective heat exchanger, said connectors being provided for on opposite sides of said exchangers.

It would have been to one having ordinary skill in the art at the time the invention was made to modify the combined teachings of Mennen et al and Reppich with the teachings of Rohsenow et al for increased mixing.

Claims 4-5 depend on claim 3 such that the reasoning used to reject claim 3 will be used to reject the dependent portions of the claims.

Regarding claim 4, Mennen et al does not disclose a plant wherein said welding points are distributed in groups of five.

Reppich discloses welding points (see pages 1001-1002, section 2.2).

Reppich does not disclose a plant wherein said welding points are distributed in groups of five.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

It would have been an obvious matter of design choice to weld heat exchanger plate such that the welding points are distributed in groups of five, since applicant has not disclosed that welding points distributed in groups of five solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with welding points distributed in groups of five.

Regarding claim 5, Mennen et al does not disclose a plant wherein the entry and exit connectors of all of the exchangers are connected to respective ducts for distributing and collecting the heat exchange fluid entering and respectively exiting from said exchangers, respectively.

Reppich discloses a plant wherein the entry and exit connectors of all of the exchangers are connected to respective ducts for distributing and collecting the heat exchange fluid entering and respectively exiting from said exchangers, respectively (see figures 1-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Claims 9-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennen et al (WO 00/43358) and Reppich (Use of high performance heat exchangers in chemical and process industries, 1999) as applied to claims 1-2 above, and further in view of Elmore et al (4,519,446).

Claim 9 depends of claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 9, Mennen et al does not disclose a plant wherein said chamber is subdivided into a plurality of chambers not directly communicating with each other, each of which is in fluid communication with said distributor duct and with said collector duct, through respective openings formed in them.

Mennen et al discloses a condenser (see Abstract).

Elmore et al discloses a condenser wherein said chamber is subdivided into a plurality of chambers not directly communicating with each other, each of which is in fluid communication with said distributor duct and with said collector duct, through respective openings formed in them (see Abstract and figure 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Elmore et al to minimize the waste heat of condensing tower (see Elmore et al column1, lines 22-28).

Claim 10 depends of claim 9 such that the reasoning used to reject claim 9 will be used to reject the dependent portions of the claim.

Regarding claim 10, Mennen et al does not disclose a plant wherein said chambers are obtained through welding lines of said metallic plates, extending perpendicularly to said ducts.

Mennen et al discloses a condenser (see Abstract).

Elmore et al discloses a condenser wherein said chambers are obtained through welding lines of said metallic plates, extending perpendicularly to said ducts (see figures 3 and 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Elmore et al to minimize the waste heat of condensing tower (see Elmore et al column1, lines 22-28).

Claim 12 depends of claim 1 such that the reasoning used to reject claim 1 will be used to reject the dependent portions of the claim.

Regarding claim 12, Mennen et al discloses a condenser (see Abstract).

Mennen et al does not disclose a plant wherein said condensation unit has a substantially annular cylindrical configuration, crossed axially by a passage with a predetermined diameter, in which said plurality of heat exchangers are distributed in many coaxial and concentric rows, in a substantially radial arrangement.

Elmore et al discloses a condenser wherein said condensation unit has a substantially annular cylindrical configuration, crossed axially by a passage with a predetermined diameter, in which said plurality of heat exchangers are distributed in many coaxial and concentric rows, in a substantially radial arrangement (see figures 3-4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Elmore et al to minimizing the waste heat of condensing tower (see Elmore et al column1, lines 22-28).

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennen et al (WO 00/43358) and Reppich (Use of high performance heat exchangers

in chemical and process industries, 1999) as applied to claim 2 above, and further in view of Heizmann (US 888,169).

Claim 13 depends of claim 2 such that the reasoning used to reject claim 2 will be used to reject the dependent portions of the claim.

Regarding claim 13, Mennen et al does not disclose a plant wherein at least one of said exchangers is internally equipped with a separator plate, extending from one side of said exchanger, towards a side opposite it and from which said plate is in a predetermined distanced relationship, said plate defining in said chamber a substantially U-shaped fluid path having descending and ascending portions respectively, in communication with the outside of the exchanger through respective connectors.

Reppich disclose a plant heat exchanger (see Abstract).

Reppich does not disclose a plate heat exchanger wherein at least one of said exchangers is internally equipped with a separator plate, extending from one side of said exchanger, towards a side opposite it and from which said plate is in a predetermined distanced relationship, said plate defining in said chamber a substantially U-shaped fluid path having descending and ascending portions respectively, in communication with the outside of the exchanger through respective connectors.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and

easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Heizmann discloses a plate heat exchanger wherein at least one of said exchangers is internally equipped with a separator plate, extending from one side of said exchanger, towards a side opposite it and from which said plate is in a predetermined distanced relationship, said plate defining in said chamber a substantially U-shaped fluid path having descending and ascending portions respectively, in communication with the outside of the exchanger through respective connectors (see figures 4 and 9 and column 1, lines 1-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined teachings of Mennen et al and Reppich with the teachings of Heizmann for maximum effective heating or cooling by providing specific passages (see Heizmann column 1, lines 11-17).

Claim 14 depends of claim 13 such that the reasoning used to reject claim 13 will be used to reject the dependent portions of the claim.

Regarding claim 14, Mennen et al does not disclose a plant wherein said separator plate extends in said chamber in a direction forming an angle with said side, for which reason the portions of said fluid path inside the exchanger have a gradually increasing cross-section.

Reppich disclose a plant heat exchanger (see Abstract).

Reppich does not disclose a plate heat exchanger wherein said separator plate extends in said chamber in a direction forming an angle with said side, for which reason

the portions of said fluid path inside the exchanger have a gradually increasing cross-section.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Heizmann discloses a plate heat exchanger with a separator that creates a passage in the heat exchanger plate (see figures 4 and 9 and column 1, lines 1-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined teachings of Mennen et al and Reppich with the teachings of Heizmann for maximum effective heating or cooling by providing specific passages (see Heizmann column 1, lines 11-17).

Heizmann does not disclose a heat exchanger wherein said separator plate extends in said chamber in a direction forming an angle with said side, for which reason the portions of said fluid path inside the exchanger have a gradually increasing cross-section.

It would have been an obvious matter of design choice to have the separator plate extends into the chamber at an angle with the side, since applicant has not disclosed that extending the separator plate into the chamber at an angle solves any



stated problem or is for any particular purpose and it appears that the invention would perform equally well with the separator plate extending into the chamber at an angle with the side.

Claim 15 depends of claim 14 such that the reasoning used to reject claim 14 will be used to reject the dependent portions of the claim.

Regarding claim 15, Mennen et al does not disclose a plant wherein said exchangers have predetermined cross sections of less than the cross sections of a manhole opening arranged in correspondence with a base plate of said reactor.

Mennen discloses a condenser (see Abstract).

Reppich disclose a plant heat exchanger (see Abstract).

Reppich does not disclose a plate heat exchanger wherein said exchangers have predetermined cross sections of less than the cross sections of a manhole opening arranged in correspondence with a base plate of said reactor.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

It would have been obvious to construct the heat exchanger such that the heat exchangers have predetermined cross sections of less than the cross sections of a manhole opening arranged in correspondence with a base plate of said reactor. For the predictable solution of the heat exchanger fitting inside the reactor, i.e., it would have been "obvious to try" the specific structure of the heat exchangers, manhole opening, and reactor base plate with corresponding cross sections.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mennen et al (WO 00/43358), Reppich (Use of high performance heat exchangers in chemical and process industries, 1999), and Elmore et al (4,519,446) as applied to claim 10 above, and further in view of Obashi (US 2001/0045276).

Claim 11 depends of claim 10 such that the reasoning used to reject claim 10 will be used to reject the dependent portions of the claim.

Regarding claim 11, Mennen et al does not disclose a plant wherein each of said chambers is internally equipped with a plurality of deflector plates, extending parallel to said ducts and defining a substantially winding path for said operating fluid.

Reppich disclose a plant heat exchanger (see Abstract).

Reppich does not disclose a plate heat exchanger wherein each of said chambers is internally equipped with a plurality of deflector plates, extending parallel to said ducts and defining a substantially winding path for said operating fluid.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Mennen et al with the teachings of Reppich for the benefits of low space requirement, faster start up/ shut down and

control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Obashi discloses a heat transfer apparatus wherein each of said chambers is internally equipped with a plurality of deflector plates, extending parallel to said ducts and defining a substantially winding path for said operating fluid (see Abstract and figure 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combined teachings of Mennen et al and Reppich with the teachings of Obashi to provide a low-cost heat transfer apparatus with good heat efficiency (see Obashi paragraph 0009).

### ***Response to Arguments***

Applicant's arguments, see Remarks, filed June 11, 2008, with respect to the objection of claim 2 have been fully considered and are persuasive. The objection of claim 2 has been withdrawn.

Applicant's arguments filed June 11, 2008 have been fully considered but they are not persuasive.

Mennen et al discloses a condenser comprising tubes that ensure intimate mixing and generates turbulence, which is favourable for heat transfer (see page 7, lines 4-21).

Reppich discloses an improvement of using heat exchanger plates instead of heat exchange tubes for high degree of turbulence, achieved even at low flow velocities, and at Reynolds number as low as 10 and higher overall heat transfer (see Reppich section 5, paragraphs 1-2) and for the benefits of low space requirement, faster start up/shut down and control of equipment, high overall heat transfer coefficient, high shearing forces and turbulences, low temperature differences, flexibility on account of modular design, and easy maintenance and dismantling for inspection or cleaning (see Reppich page 1000, column 1, 4th paragraph).

Figure 1 of Reppich is just an example of the use of the heat exchange plates, but even if the plates could only be arranged in figure 1 of Reppich one of ordinary skill would be able to insert the plate heat exchanger assembly into a combination condenser/reactor. The plates would be arranged parallel to the longitudinal axis of the reactor.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATASHA YOUNG whose telephone number is (571)270-3163. The examiner can normally be reached on Mon-Thurs 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NY

/Glenn A Caldarola/  
Acting SPE of Art Unit 1797